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Title of the Invention: **Brush-Manufacturing Machine with Eyed Needles**

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Brief Description of the Drawings

Fig. 1 shows a side cross-sectional view of the locations in a machine at which fluff thread is retracted; Fig. 2 shows an enlarged view in which part of a needle is cut out; Fig. 3 shows a longitudinal cross-sectional view along the line II-II in Fig. 2; Fig. 4 shows a brush in which an uneven thread forms simple woven loops; Fig. 5 shows a brush in which the uneven thread in Fig. 2 is fashioned into a tricot weave; and Fig. 6 shows a longitudinal cross-sectional view of a double-sided brush.

Detailed Description of the Invention

The present invention relates to a brush-manufacturing machine with eyed needles, and in this machine, fluff thread is guided into the eye, a retainer is disposed on the needle, and the retainer is retracted from the needle into the fabric material to hold needle loops that form a brush.

Only uneven thread, that is, fluff thread, can be processed by needles in this type of conventional machine, which is commonly referred to as a tufter. Consequently, the woven fabric made by this type of machine comprises merely a fabric material and a fluff thread for forming a fluff surface.

In contrast to the prior art, an object of the present invention is to employ eyed needles to simultaneously process a second uneven thread, which has proven to be advantageous in various aspects. Therefore, according to the present invention, it is possible, for example, to tightly bond the brush loops of fluff thread to fabric material by means of the second uneven thread. This is possible when the fabric material comprises finished cloth, and the brush loops are retracted into the cloth from behind. When the fabric material comprises wefts that are connected to each other by a thread ring in the machine, the second uneven thread undertakes the role of simultaneously connecting the wefts to each other in addition to providing a tight bond for the brush loops.

As such, tightly bonding the brush loops of a brush composed of needle loops to the fabric material is conventional technology. In this case, however, since a second eyed needle and another crochet needle attached to this needle must additionally be disposed on the machine for the second thread, the locations at which fluff is retracted have a total of three needles.

Furthermore, according to the present invention, the presence of a second uneven thread makes it possible for a second fluff surface that comprises needle loops in the same manner to be formed on the reverse side of the fabric material, but this task could not be easily accomplished by the prior art as long as eyed needles were employed to retract the original fluff thread. It is also conventionally known that a fluff surface composed of needle loops is attached to a fabric material by a crochet needle, but there is no premise in this case for forming a second fluff surface with brush loops composed of needle loops.

The intended object is achieved as follows according to the present invention. Specifically, the needle has a hook in front of its eye, and a second uneven thread can be fastened to the hook of this needle by a guide, so the needle retracts the loops formed from the second uneven thread into the fabric material in a manner opposite to that of the fluff thread and needle loops.

Shuttle knitting machines that have needles with two eyes, and are therefore suitable for processing two uneven threads, are conventionally known. However, these two threads are

processed alternately; particularly, the use of needles with two such eyes makes it impossible to retract two loops in mutually opposite directions in the fabric material.

Next, various embodiments of the present invention will be described by means of diagrams.

The machine is equipped with a needle 1, a spring cam 2, a pressure cam 3, a loop retainer 4, and a guide 5. Fabric material 6 passes through the machine between the spring cam 2 and the pressure cam 3 in the direction of the arrow X in Fig. 1. The needle 1 is provided with an eye 7, in front of which is provided a hook 8. In addition, the needle has a pointed tip at its free end. The needle 1 is primarily a sliding needle. The primary role of a moving rod 10 is to close the hook 8 of the needle when the needle 1 is pulled back through the fabric material 6. A fluff thread 11 is guided into the needle eye 7. By contrast, the guide 5 guides a second uneven thread 12, and this thread can be inserted into the hook 8 of the needle 1 by means of the guide 5. The fluff thread is retracted from the reverse side of the fabric material to the inside of the fabric material in the shape of a needle loop by the needle 1, whereby brush loops 13 are formed.

Since the needle 1 is pulled back after reaching the final forward position, the needle loop forming the brush loops 13 is drawn out as though by a sewing machine. The loop retainer 4 then enters this drawn out needle loop from above. A plurality of such loop retainers can therefore move at right angles to the needle by conventionally known methods. These loop retainers also have the function of determining the length of the brush loops 13, and therefore can similarly move parallel to themselves by conventionally known methods. A second warp thread 12 is fastened to the needle 1 by means of the guide 5 at the same time that the needle reaches the forward final position. In this case, the guide 5 has a single eyed needle 14 for each needle 1. The hook 8 of the needle 1 faces in the fabric withdrawal direction X, and the second uneven thread 12 is processed with single weave patterns, as shown in Figs. 1 and 4, when each of the eyed needles 14 merely keeps the second uneven thread 12 in contact with the same needle (tufting is performed). Upright needle eyes 15 extend from these weave patterns on the front side of the fabric material, and needle loops 16 are disposed on the reverse side. In this case, the moving rod 10 of the needle 1 has the role of coiling an occasional final needle weave 16a by conventional methods via a newly formed loop of the corresponding second uneven thread 12.

Specifically, in the above-mentioned processes, the loops of the second uneven thread 12 for forming seams 16¹ are different from the brush loops 13 drawn out from right to left through the fabric material 6. The fabric material 6 can in this case be made from finished cloth, for example, a belt of woven fabric, and can also be made, for example, from individual wefts, as shown in Figs. 1, 4, and 5. Next, as shown in German Patent Specification No. 1059608 (Kl, 25a, Gr, 17/05), when, for example, the wefts are loosened and supplied to the warp retraction points by two conveyor belts, the second uneven thread 12 joins the warps to each other directly above the machine. Furthermore, the second uneven thread 12 has a function of first firmly tying the brush loops 13 to the fabric material 6, but this is also done when the fabric material 6 is made from finished cloth, such as woven fabric. The brush loops 13 are firmly tied by inserting one side 13a into the head portions of the seams 16, which is done because the retraction directions of the two needle loops are opposite each other.

As is clear from Fig. 5, the second uneven thread 12 can also be made into a tricot weave. Specifically, each thread of the uneven thread 12 is fastened on two mutually adjacent needles 1. The finished product is shown in Fig. 5, and this product has merits in that a warp 17, loosened under the upright needle eye 15 that faces the product at an angle, can be joined to the fabric material 5.

When the hook 8 of the needle 1 faces in the fabric discharge direction X, it is possible to retract the second uneven thread 12 into the fabric material in the same shape as the fluff loops 20. The hook 8 in this case operates like the eye 7 of the needle 1, and when the needle 1 comes to the retracted position, the needle loop that has been retracted last and formed by the uneven thread 12 falls off from the hook 8. Therefore, the moving rod 10 must of course be pulled back. In this manner, a double-sided brush can be made. A fluff surface is formed on the front side of the woven fabric by the brush loops 13 of the fluff thread 11, and a fluff surface is formed on the reverse side by the loops 20 of the second uneven thread 12. It is apparent that such a double-sided brush can be produced when a fabric material 6 made from finished cloth is used.

The needle 1 is preferably provided with a concavity on the side on which the loop retainer 4 operates, as shown in Fig. 3. It is effective to provide the other side of the needle 1

¹ Translator's note: Referred as "needle loops 16" hereinabove.

with a groove 19 designed for guiding the fluff thread 11 to within the range of the fabric material 6.

The present invention is embodied as follows.

(1) A machine with eyed needles for manufacturing brushes, wherein a second uneven thread 12 is processed in a weave pattern differently from an interlocked fluff thread because the hook 8 of a needle 1 faces the fabric delivery side X.

(2) A machine with eyed needles for manufacturing brushes, wherein the loop on the reverse side of the woven fabric formed by the second uneven thread 12 is used to form a second fluff surface because the hook 8 of the needle 1 faces the fabric delivery side X.

(3) A machine with eyed needles for manufacturing brushes, wherein the needle 1 can rotate 180° around its longitudinal axis to alternately form a weave pattern and brush loops from the loops of the second uneven thread 12.

Claims

1. A brush-manufacturing machine with eyed needles, wherein a fluff thread is guided into a needle eye, a retainer is disposed on the needle, and a needle loop retracted from the needle into fabric material to form brush loops is held by the retainer; said brush-manufacturing machine with eyed needles characterized in that the needle has a hook in front of the needle eye thereof, a second uneven thread can be inserted into the hook of the needle by a guide, and the needle therefore retracts the loop formed from the second uneven thread into the fabric material opposite from the fluff thread needle loop.

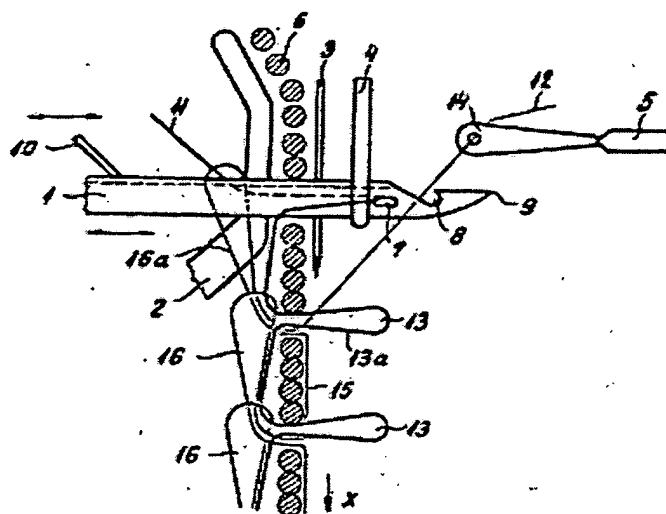


Fig. 1

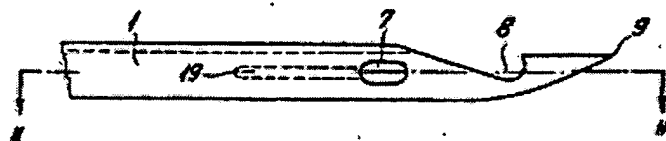


Fig. 2

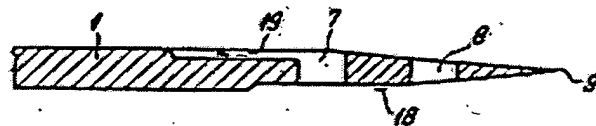


Fig.3

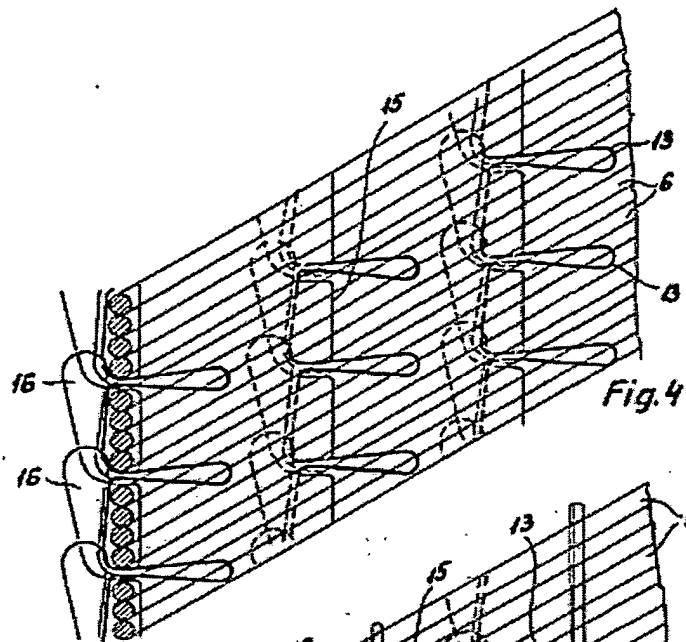


Fig. 4

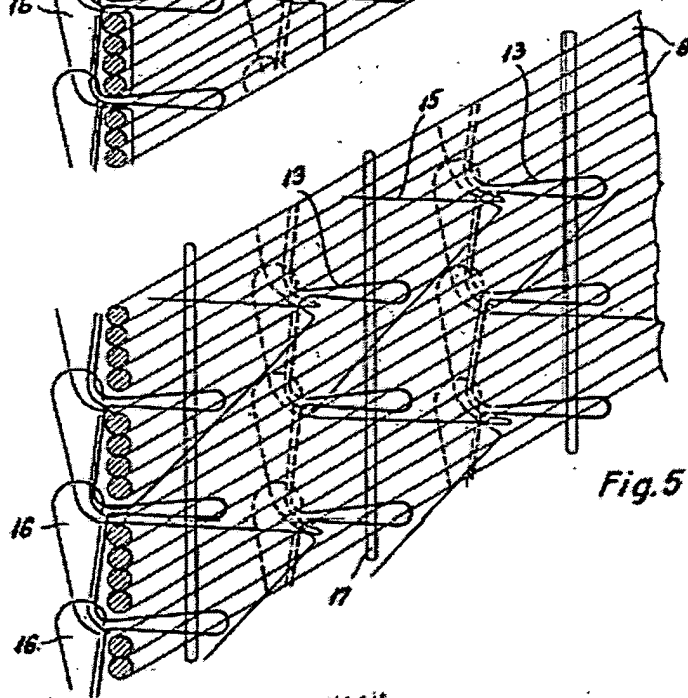


Fig. 5

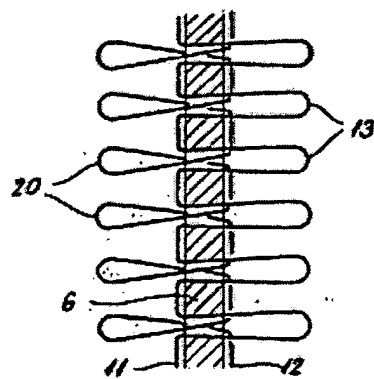


Fig. 6